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(19) (CA) **CANADIAN PATENT** (12)

(54) FREE STANDING WALL SYSTEM

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ABSTRACT

The invention relates to a free-standing wall or partition assembly wherein a plurality of panel members are removably connected to upright support poles by a plurality of panel-to-pole clips. In the invention a frame member along the edge of the panel member has a channel in which unitary clips having a base portion receivable in the channel are slidable. Each clip has arcuate side walls to grip a support pole and planar walls connecting the side walls to the base. The planar walls are resiliently biased against the edges of the channel to keep the clip in position but by squeezing the side walls together the clip may be slid along the channel to a new location. Also disclosed is a new and improved structure for joining adjacent pole sections together and a new and improved male and female clip assembly for directly joining panel members together without an intervening pole.

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This invention relates to walls and partitions in general and to free-standing wall systems in particular.

BACKGROUND OF THE INVENTION

Free-standing wall or partition systems are well known, as exemplified by Canadian Patent No.926,593 issued May 22, 1973 to Nimmo and by Canadian Patent No. 1,039,916 issued October 10, 1978 to Kepac Limited. The systems illustrated in such patents can be used as dividing walls in an office environment or they can be used as free-standing displays for advertizing or exhibition purposes. Such systems utilize panels, which represent the dividing or display portion, and appropriate structure to connect the panels together. Usually a post or pole separates adjacent panels, with the panels carrying clips which snap on to, or otherwise engage, the poles whereby the poles carry or support the panels. In the Nimmo patent referred to above an aluminum alloy clip is carried by the panel and snaps on to a cylindrical pole member for support. Adjacent lengths of pole material may be joined together by a connector which has a non-circular outer periphery, preferably oval, and is receivable in a corresponding internal "bore" in the pole. Adjacent poles having a connector therein can be twisted or rotated relative to each other so that they are locked together. A similar clip construction is used in the Kepac structure to secure the panels to the poles. Neither of these patents shows a mechanism for directly joining one panel to another panel without the use of an intervening pole. Also the clips, connectors and means for assembling said items to the panels and or poles are cumbersome and, in many instances, inefficient.

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SUMMARY OF THE INVENTION

The present invention provides an improved wall, screen or partition system which improves on the individual items of the prior art, achieving an attractive, yet economical and efficient system. In the present invention the clips for attaching the panels to the poles are adapted to slide in a channel provided in a frame member of the panel and any number of clips and any positioning of the clips may be used. The clips are sprung against the restraining edges of the channels and such springiness tends to lock the clips in the desired position although they can be easily moved by squeezing the gripping legs together and sliding the clip along the channel. The channel can also accommodate clips which are designed to interlock together so that a panel may be secured to an adjacent panel without using a support pole therebetween. Such clips come as male and female pairs and are dimensioned so that there is very little, if any, gap between adjacent panels when they are secured together.

The invention also provides an improvement in joining adjacent pole sections together so as to achieve support poles of different heights. Each pole section has a cylindrical cross-section with a circular hollow interior. Adjacent each end the pole section is provided with a pair of radially inwardly directed and axially aligned dimples. The dimples are receivable in a longitudinal groove in the outer periphery of a connector member and when two adjacent pole sections with a connector member therebetween are twisted relative to each other the dimples will frictionally engage the sides of the groove to lock

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each pole section to the connecting member. Both dimples of one pole section may engage the groove of the connecting member or, alternatively the dimple farthest from the end of the pole section may be either deeper than the other or circumferentially offset from the other to act as a stop to prevent over-insertion of the connector member into the pole section. If the fit between the connector member and the adjacent pole sections is fairly tight, then it may not be necessary to twist-lock the adjacent pole sections to the connector member although a stronger connection will result from the locking step.

Broadly speaking now, the present invention provides, a free-standing wall or partition assembly comprising: a plurality of generally rectangular panel members having corner-abutting frame members along the periphery thereof, each frame member having an outer, longitudinally extending channel therein defined by side walls of the frame member and reentrant opposing flanges extending inwardly from the free edges of the side walls; a plurality of cylindrical support pole means to which the panel members may be connected to form the assembly; and means for connecting the panel member to the support pole means, the connecting means including a plurality of unitary clips, each clip being formed from a resilient spring material and having a base portion for sliding reception in the channel, a gripping portion for resiliently snapping over and engaging the support pole means and a connection portion interconnecting the base portion and the gripping portion, the connection portion being resiliently biased into engagement with the reentrant flanges to prevent undesired sliding movement of the clip in the channel and

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being moveable out of engagement with the flanges to permit sliding repositioning of the clip within the outer channel.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows in side elevation a pair of panels joined to a support pole in accordance with the present invention.

Figure 2 shows a section of a panel, frame, clip and pole in operative condition taken on the line 2-2 of Figure 1.

Figure 3 is an end view of a clip as used in the present invention.

Figure 4 is an enlarged partial view of a corner of a panel showing the manner in which the frame members are connected together.

Figure 5 is a top view of a frame member to show an insertion opening for a clip.

Figure 6 is a section on the line 6-6 of Figure 1 showing how the pole sections may be connected together.

Figure 7 is an exploded view of a connector member and a pole section.

Figure 8 is a perspective view of a pair of mating panel-to-panel clips.

DETAILED DESCRIPITION OF THE INVENTION

Figure 1 shows the basic configuration of a free-standing wall, partition or display system utilizing the present invention. The basic system includes a plurality of panels 10, means such as a support pole 12 for supporting the panels in the desired orientation, and means such as clips 14 for connecting the panels to the poles. The panels 10 may be of any appropriate construction, such as wood, aluminum or, as contemplated herein,

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a honeycomb cardboard panel having a decorative coloured, covering thereover. While a preferred form for the panel has been indicated it is important to note that the panel construction per se does not form a part of the invention.

With reference now to Figures 1 and 2 it is seen that each panel 10 is provided around its periphery with a plurality of frame members 16. As seen in Figure 2, each frame member 16 has a pair of opposed sides 18 joined by a transverse web 20. The sides 18 and web 20 define a first longitudinally extending inner channel 22 on one side of the web 20, the channel 22 being of a width to smoothly receive the panel 10. On the other side of the web 20 it is seen that flanges 24 project inwardly from the free edges of sides 18, the flanges defining therebetween a longitudinally extending slot or opening 26 and also defining, with web 20 and sides 18 a second longitudinally extending outer channel 28 on the other side of web 20, facing away from channel 22. Channel 28 is accessible by way of slot or opening 26.

As seen in Figures 1 and 4 each frame member 16 abuts an adjoining frame member 16 at a corner of a panel by way of mitered ends 29. When assembling the frame members to the panel 10 the frame members for two opposing sides are first of all placed in position along the panel edge with the panel edge being received in the channel 22 of each frame member. The frame members for the other two opposing sides are each provided with an L-shaped locking member 30, one leg of each such member being slid into the channel 28 from the ends of the frame member 16. Each locking member 30 has a width essentially equal to that of channel 28 and a thickness less than the height of channel 28.

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Also each leg of the member 30 has a pair of aligned threaded bores, each receiving a set-screw 32, access to which is provided by the slot or opening 26. With the members 30 loosely positioned one at each end of the remaining frame members 16, those frame members are assembled to the panel 10 in such a manner that the other leg of each locking member 30 enters the channel 28 of the adjacent, already positioned frame member 16. All of the set-screws 32 are then tightened, the effect being to lift each leg of each locking member 30 away from its adjacent portion of the web 20 and to force the opposite surface of each leg into tight engagement with the underside of the flanges 24 opposite the web 20. The members 30 are thus locked into their corner positions and the frame members are prevented from inadvertant removal from the panel 10. The members 30 also reinforce the corner areas of panel 10, making the corner areas stronger and less susceptible to damage in the event a panel is dropped on a corner.

The clip 14 will be described with reference to Figures 1, 2 and 3. It is seen first of all that the clip 14 is unitary in nature, being formed from sheet material such as .025" spring steel. The clip includes a base portion 34 which has a width and height sufficient for a smooth, but not loose, reception in channel 28. The base portion is defined by the generally flat floor portion 35, the lower sides 36 rising from the floor portion 35 and the reentrant flanges 38. Converging side portions 40 extend away from the free end of flanges 38 and terminate in outwardly curved gripping portions 42. Each gripping portion 42 terminates in an outturned end portion 44, the two end portions 44 defining therebetween an entrance guideway for the

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support pole 12 [redacted]ring assembly of the clip ther[redacted].

While the radius of curvature of each gripping portion 42 is essentially the same as the outside diameter of the support pole 12 to which it will be attached it is seen that in Figure 3, in the relaxed, unassembled state, the widest distance between the gripping portions 42 is considerably less than the operative separation distance when assembled to the support pole 12, as seen in Figure 2. This is achieved during the forming stage of the clip by having the side portions 40 converge as seen in Figure 3. When the clip is assembled to a support pole the end portions 44 will initially engage the side wall of the support pole and with continued pressure towards the pole the gripping portions will spread against the gripping forces provided by the converging side portions 40 and the spring-like base portion 34. Once the end portions 44 pass the widest part of the support pole the clip will actually by drawn onto the pole by the spring forces generated within the clip as it is spread for the assembly operation. Additional gripping pressure is generated due to the resistance to spreading of the gripping portions 42 by abutting engagement, during the spreading phase, between each side portion 40 and the edge of adjacent flange 24.

When the clip 14 is positioned in the channel 28, as in Figure 2, prior to assembly to a support pole, it is possible to slide the clip to any desired location along the channel between the locking members 30. It is desirable for the side portions 40 to be initially formed so that when the clip is positioned in the channel 28 the side portions will exert a slight, outwardly directed pressure against the

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edges of the [redacted]nges 24. In this configurati[redacted] if it is necessary to slide a clip along the channel 28, the gripping portions 42 are squeezed together to release the pressure exerted by the side portions 40 and the clip may then be slid to its new location. Release of the squeezing pressure will permit the side portions to spread back into a frictional locking engagement with the edges of flanges 24. In this manner a clip may be located anywhere along the channel 28 without fear that it will move from its desired location even when the channel is in a vertical orientation.

Clips may be assembled to a channel 28 before the frame member 16 is assembled to a panel 10 merely by sliding them into the open end of the channel before a locking member is secured therein. This may not be convenient at a later point in time when a wall configuration is to be changed and it is necessary to reposition clips from one frame member to another frame member or to merely remove unnecessary clips from a particular frame member. In order to remove, or insert, clips from, or into, a channel 28 one flange 24 of each frame member is modified as in Figure 5. There it is seen that a section of one flange 24 has been cut back as at 46 for a distance slightly greater than the length of a clip 14. The distance "D" between the base of the cut out 46 and the edge of the opposite flange 24 is just slightly greater than the distance "d" (Figure 3) between the outside "B" of one lower side 36 and the outside "A" of the opposite side portion 40. When inserting a clip into a channel 24 at the insertion zone defined by the cut out 46 the area "A" of the clip is brought against the edge "E" of the flange 24

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with the adjacent reentrant flange 38 and side 30 positioned under the flange 24. The clip is then rotated towards the web 20 so that the side "B" of the clip passes the edge "F" of the cut out 46 until the floor portion 36 of the clip rests on the web 20. The clip may then be slid along the channel 28 to its desired location.

Turning now to Figures 1, 6 and 7 the support pole 12 and structure for connecting adjacent poles together will be described. Figure 1 shows a pair of support poles 12 in axial alignment with the upper pole carrying a suitable decorative cap 48 which is secured to the upper pole in any convenient and well known manner. In order that the wall system of the present invention may be as versatile as possible, however, it should be possible to construct walls of any desired height and thus, when using support poles of specific, standard lengths, it may become necessary to assemble several pole sections together to achieve the desired height. Since considerable transverse force is exerted on a support pole when one or more panel clips is attached thereto the joint between adjacent pole sections should be as strong as possible to avoid a loss of alignment when a panel is attached to an assembled pole.

As seen in Figures 6 and 7 the pole 12 is of cylindrical form and cross-section. The pole 12 is desirably a seamless extruded section of aluminum tubing. Adjacent each end thereof a pair of axially aligned, radially inwardly directed, generally spherical dimples 50 are formed in the side wall of the pole section. Axially inwardly of the innermost dimple 50, and preferably circumferentially offset therefrom, is a third dimple 52 which is larger and deeper than the other dimples 50.

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When forming the dimples 50 and 52 in aluminum tubing it is not sufficient to merely apply pressure through a forming tool onto the outer surface of the tubing since this tends to cause sharp stress cracks and rough edges on the formed dimple surface within the tubing, which rough edges and surfaces can damage anything slid into the tubing that is of aluminum or a softer material. In order to avoid such a problem the present invention contemplates a dimple forming process which results in a smoothly formed dimple. In the process the tubing is supported internally on a mandrel held in a vise below a rotatable forming tool held in an appropriate machine such as a drill press. The forming tool has a non-cutting conical end which will form the dimple in the tubing. Under the effect of high rotational speeds and downwardly-directed pressure the material of the tubing in the vicinity of the tool end is heated and softened sufficiently that it will flow and deform to the shape of the tool end. Since the tubing material is thus subjected to plastic deformation there will be no stress cracks or rough edges on the other side of the dimple within the tubing. The tubing surface subjected to the action of the forming tool may have burrs thereon but it is a simple process to debur the material after the dimple-forming process.

A joining piece 54, formed from appropriate material, such as extruded aluminum, is used to join adjacent lengths of pole sections 12 together. Each joining piece 54 is about 8 inches long and is essentially circular in cross-section for smooth, almost tight reception within the pole section 12

(Figure 6). The joining piece 54 has, however, an axially and radially displaced groove 56 in the wall thereof, which groove is sized to receive the dimples 50 but not the dimple 52. There is a smoothly curved transition area 60 from the cylindrical wall of the joining piece 54 to the side wall 62 of the groove 56.

When joining two lengths of pole sections 12 together a joining piece 54 is first of all fitted into the open end of one section with the groove 56 receiving, or mating with the dimples 50. The depth of insertion of the joining piece into the pole section 12 is controlled by the dimple 52 which cannot be received in the groove 56, due to being offset therefrom, and thus acts as a limit stop to prevent any further insertion of the joining piece. A second pole section 12 is then slid over the exposed length of the joining piece with the dimples 50 aligned with the groove 56 until the two pole sections abut each other. The pole sections 12 may then be twisted relative to each other on the joining piece 54 to force the dimples 50 of one pole section 12 into frictional locking engagement with the transition area 60 along one side of the groove 56 while the dimples 50 of the other pole section are forced into frictional locking engagement with the transition area 60 along the other side of the groove 56. In this manner both pole sections are securely locked to the joining piece 54 and a solid support pole results. The smooth nature of the dimples prevents any damage to the joining piece 54.

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The number of dimples 50 is not restricted to two and, in fact, if the outer diameter of the joining piece 54 and the inner diameter of the pole sections 12 can be controlled during manufacture to ensure a close, tight, almost interference fit therebetween, it might be possible to eliminate the dimples 50 and the groove 56 altogether. The dimple 52 would still be used to limit inward movement of the joining piece 54 although it could be of less depth than before.

The final aspect of the present invention to the described herein is the panel-to-panel clip structure as shown in Figure 8. This structure is used when it is desired to assemble panels together without the benefit of an intervening support pole. The clip structure of Figure 8 includes a male clip 64 and a female clip 66 each of which is adapted for insertion and positioning in the channel 28 of a frame member 16 in the same manner as a clip 14. Both clips 64 and 66 are preferably formed from spring steel.

The male clip 64 has an enlarged, almost teardrop shaped curved nose piece 68 which has converging side walls 70. The side walls 70 then diverge into oppositely directed feet 72 which in turn lead into legs 74 and reentrant flanges 76. The feet 72, legs 74 and flanges 76 define a base which is receivable in a channel 28 in the same manner as the base 34 of a clip 14. By forming the clip 64 from spring steel the properties of the material are used to lock the clip in position in a channel 28. For example it is necessary to squeeze the two side walls 70 together in order to insert a clip 64 into a channel 28 by way of cutout 46.

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The female clip 66 has a base portion 78 formed like base 34 of clip 14, with a floor portion 80 and side portions 82. Each side portion 82 leads into an inwardly curving gripping portion 84 which terminates in an outwardly curving and reentrant C-shaped guide wall. The female clip 66 may be inserted into a channel 28 in the same manner as a clip 14, the spring nature of the material serving to hold it in position.

When two panels are to be joined together without a support pole, a plurality of male clips 64 are positioned in the channel 28 of a frame member 16 on one panel and a corresponding plurality of female clips 66 are positioned in the channel 28 of the opposing frame member 16 on the other panel. The panels are brought together so that the nose pieces 68 of the male clips are aligned with and introduced into the converging mouths of the female clips 66 as defined by the curving guide walls 86. Further force causes the nose pieces 68 to spread the walls 84 of the female clips 66 until the area of maximum width of the nose pieces 68 pass the area of minimum width between the walls 84 and the walls 84 then close in on the nose pieces 68 to lock them in place. To separate adjacent panels it is only necessary to force them apart so as to effect disengagement between the male and female clips.

It is not necessary to have male clips only on one panel and female clips only on the other panel. Male and female clips may be intermixed on any one panel as long as corresponding female and male clips are provided on the opposite panel.

It is understood that the foregoing describes the preferred form of the present invention but it is also understood

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that variati[redacted] therein could also be achiev[redacted]by a person skilled in the art without departing from the spirit of the invention. Hence the protection to be afforded the invention is to be determined from the claims appended hereto.

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THE EMBODIMENTS [redacted] THE INVENTION IN WHICH AN EXC[redacted]IVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A free-standing wall or partition assembly comprising:
a) a plurality of generally rectangular panel members having corner-abutting frame members along the periphery thereof, each frame member having an outer, longitudinally extending channel therein defined by side walls of the frame member and reentrant opposing flanges extending inwardly from the free edges of said side walls;
b) a plurality of cylindrical support pole means to which said panel members may be connected to form said assembly; and
c) means for connecting a said panel member to a said support pole means, said connecting means including a plurality of unitary clips, each clip being formed from a resilient spring material and having a base portion for sliding reception in a said channel, a gripping portion for resiliently snapping over and engaging a said support pole means and a connection portion interconnecting said base portion and said gripping portion, said connection portion being resiliently biased into engagement with the reentrant flanges to prevent undesired sliding movement of the clip in the channel and being moveable out of engagement with said flanges to permit sliding repositioning of the clip within the outer channel.

2. The assembly of claim 1 wherein each said frame member includes a longitudinally extending transverse web between said side walls, said web defining said outer channel on one side thereof and, on the other side thereof defining with said side walls an inner channel in which the peripheral edge portion

of the panel member is receivable.

3. The assembly of claim 2 wherein the ends of each frame member are mitred for mating abutment with the mitred end of an adjacent frame member, the abutting frame members being connectable to each other by an L-shaped locking member, the legs of which are receivable in and securable to the corresponding outer channel of the abutting frame members.

4. The assembly of claim 1 wherein each of said support pole means includes at least two co-axially abutting pole sections joined together by a joining piece, each pole section being cylindrical in cross-section and having a cylindrical internal bore and, adjacent each end thereof, at least one dimple extending radially inwardly from the outer surface of the pole section, said joining piece being cylindrical in cross-section and being slidably receivable in said internal bore up to a limit defined by said dimple whereby a portion of said joining piece will extend outwardly from the bore of a pole section for reception in the bore of an adjoining pole section.

5. The assembly of claim 4 wherein on each pole section a second dimple, smaller than said one dimple, is positioned in the pole section between the one dimple and the adjacent end of the pole section, and wherein said joining piece includes a longitudinally extending groove directed radially inwardly from the outer surface thereof, the second dimple of adjoining pole sections being receivable in said groove.

6. The assembly of claim 5 wherein the outer surface of said joining piece curves smoothly into the side walls of said groove whereby by twisting adjoining pole sections oppositely

to each other with said joining piece in position the second dimple of each pole section is forced into frictional locking engagement with a corresponding curved side wall of said groove.

7. The assembly of claim 6 wherein each pole section includes two of said second dimples axially spaced apart for reception in the groove of the joining piece.

8. The assembly of claim 1 wherein a portion of one of said reentrant flanges is cut out for a distance therealong slightly greater than the length of a said clip so that a said clip may be inserted into the outer channel through the gap defined between the cut out area of the one flange and the edge of the opposing flange.

9. A clip for use in connecting a planar panel member having a restrictive channel along at least one edge thereof to cylindrical support pole means, comprising: a base portion for sliding reception in said channel; a gripping portion for ~~resiliently~~ resiliently snapping over and engaging said support pole means; and a resilient connection portion interconnecting said base portion and said gripping portion, said connection portion being resiliently biased into engagement with edge portions of said channel to prevent sliding movement of said clip in said channel and being moveable out of engagement with said edge portions for slidingly repositioning the clip within the channel.

10. The clip of claim 9, being formed of resilient spring sheet material which is bent into the desired unitary configuration.

11. The clip of claim 9 wherein said base portion in cross-section conforms generally to the internal cross-section

of said channel and is generally C-shaped, said gripping portion comprises a pair of arcuate side walls of a radius essentially equal to that of said support pole means, and said connection portion comprises a pair of planar side walls which in the non-gripping condition of said clip converge from the base portion towards the arcuate side walls of the gripping portion.

12. The clip of claim 11 and including, along the free edge of each arcuate side wall, an entrance guide wall which projects out and away from the arcuate side wall , the guide walls serving to guide the clip onto the support pole means.

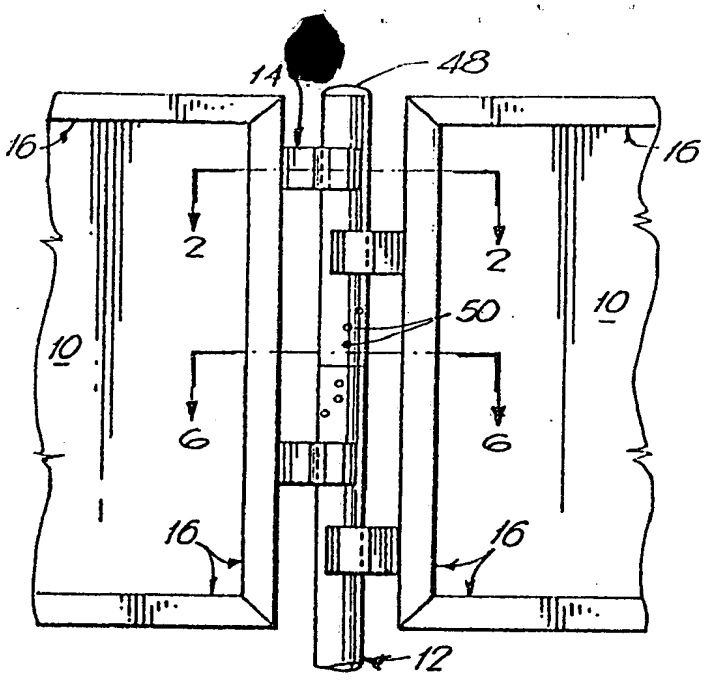

FIG. 1.

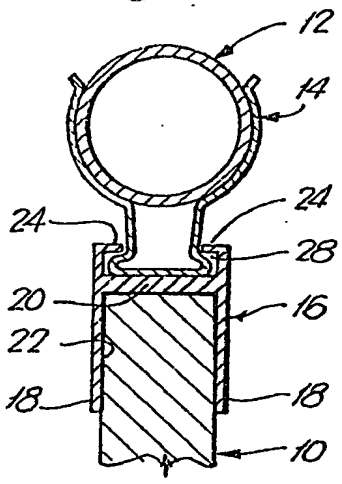

FIG. 2.

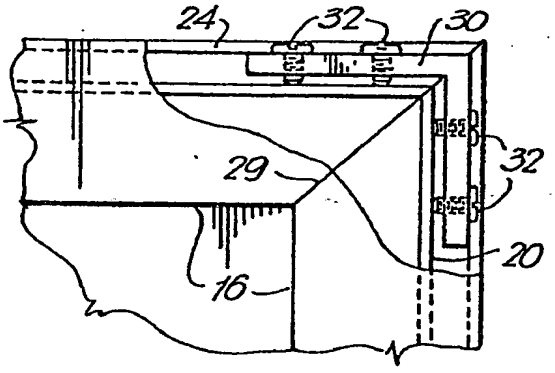

FIG. 4.

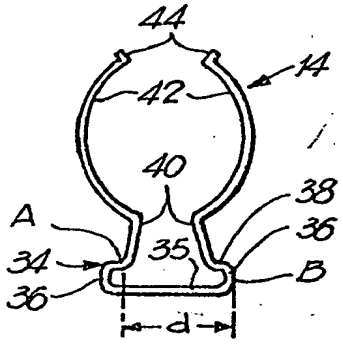

FIG. 3.

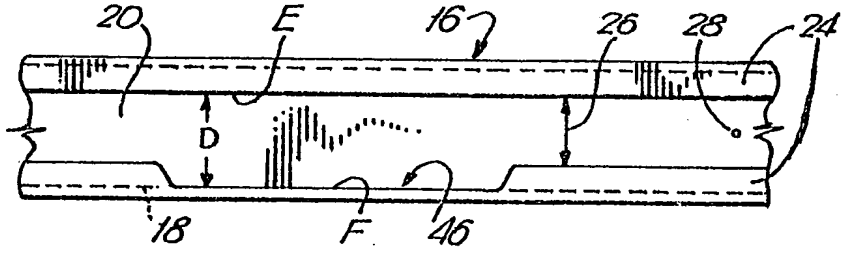

FIG. 5.

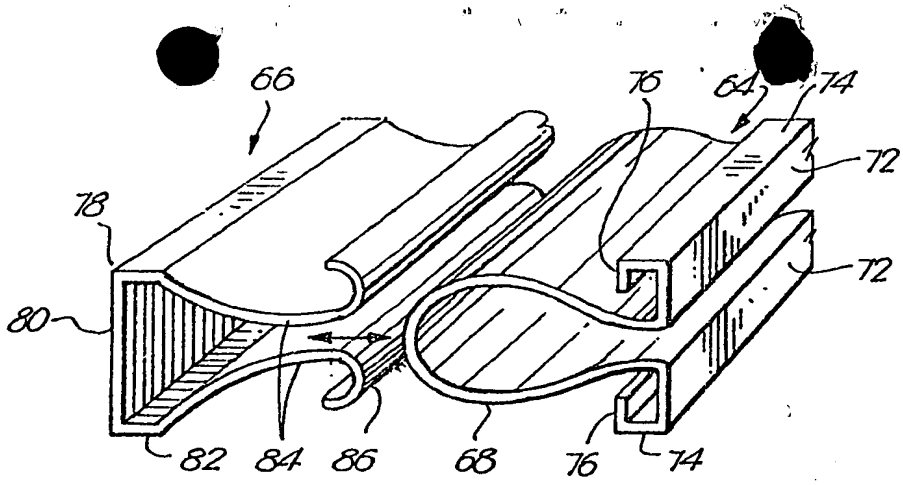

FIG.8.

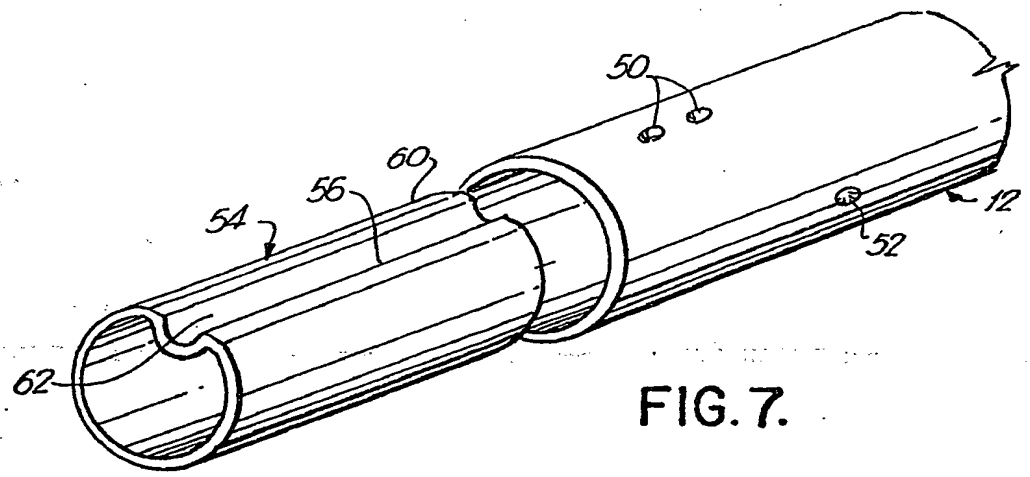

FIG.7.

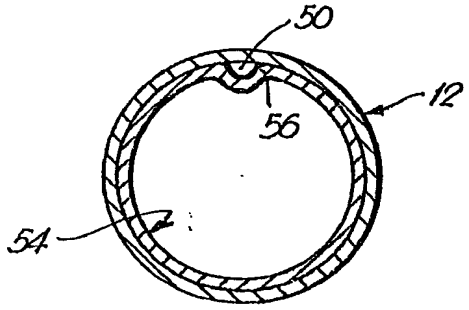

FIG.6.